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SUBJECT: RESULTS OF PESTICIDE ANALYSIS OF GROUND WATER MONITORING FOR THE RED IMPORTED FIRE ANT PROJECT IN ORANGE AND RIVERSIDE COUNTIES (STUDY 195)

SUMMARY

Ground water samples were collected from ten wells in Riverside and Orange counties, Calif. Samples were collected in February 2001 in Orange County and in November 2000 and June 2002 in Riverside County. Samples were analyzed for bifenthrin, fenoxycarb, hydramethylnon, pyriproxyfen, chlorpyrifos, diazinon, dimethoate, malathion, and methidathion. There were no detections above the reporting limit for any of the nine insecticides.

SCOPE OF THIS MEMORANDUM

This memorandum reports results of ground water sampling conducted by the Department of Pesticide Regulation (DPR), under interagency agreement with the California Department of Food and Agriculture (CDFA), for the Red Imported Fire Ant (RIFA) control project. Data included here are from November 2000, February 2001 and June 2002 monitoring, and contain results from chemical analyses. This memorandum summarizes results for bifenthrin, fenoxycarb, hydramethylnon, pyriproxyfen, and five organophosphorus insecticides: chlorpyrifos, diazinon, dimethoate, malathion, and methidathion. Only bifenthrin, fenoxycarb, hydramethylnon, pyriproxyfen, and chlorpyrifos are used in the RIFA control program. The other four organophosphates are in our multiresidue analytical method.

This memo and the monthly surface water sampling results memos are available by calling the number above or you may view or download them from DPR's website at <www.cdpr.ca.gov/docs/rifa>.

MATERIALS AND METHODS

Sample and Data Collection

Ground water samples were collected in two counties with large RIFA infestations and RIFA insecticide treatments. Samples in Riverside County were collected in the Palm Springs area on November 14, 2000 and June 11, 2002 from golf courses and nurseries that were under a compliance agreement with CDFA for treatment if RIFA was found on the property. Samples in Orange County were collected in February 27, 2001 near nurseries required to treat for RIFA.

Site	Latitude	Longitude
Riverside County		
Canyon Country Club	33.78573	-116.53503
Bel Aire Greens	33.80848	-116.51327
Seven Lakes Country Club	33.79818	-116.50003
Tamarisk County Club	33.77467	-116.42823
California Desert Nursery	33.73535	-116.29315
Orange County		
El Toro #1	33.66640	-117.76768
El Toro #2	33.68473	-117.74397
Tosco #1	33.71358	-117.75998
Tosco #2	33.71379	-117.75992
Rose Canyon	33.65992	-117.58525

Samples were collected by obtaining ground water from wells prior to the water going into a tank. The wells in Riverside County all had a sample port at which water was collected. The El Toro and Tosco wells in Orange County were monitoring wells without submersible pumps. At these sites sampling was coordinated so that samples were collected alongside county well monitoring personnel using their equipment. The El Toro wells were collected by submersing a pump into the well and sampling from a ball check valve. The Tosco wells were sampled by submersing a plastic bailer and directly filling the sample bottles. Samples designated for organophosphate chemical analysis were preserved by acidification with 3N hydrochloric acid to a pH between 3.0 and 3.5. Because diazinon rapidly degrades under acidic conditions, it was analyzed from a separate, un-acidified sample. All samples were stored on wet ice or in a 4^{o} C refrigerator until transported to the appropriate laboratory for analysis.

Environmental Measurements

Water pH was measured using an IQ Scientific Instruments® (model IQ 150) pH meter

Insecticide Analyses

All water samples were analyzed for bifenthrin, fenoxycarb, hydramethylnon, pyriproxyfen, chlorpyrifos, diazinon, dimethoate, malathion, and methidathion. The CDFA Center for Analytical Chemistry performed all analyses using gas chromatography and a flame photometric detector for the five organophosphorus insecticides; a high performance liquid chromatography and a ultra violet detector for fenoxycarb, hydramethylnon, and pyriproxyfen; and gas chromatography with an electron capture detector confirmed with a mass selective detector for bifenthrin. The reporting limit (reliable detection level) for chlorpyrifos and diazinon is 0.04 ppb, 0.1 ppb for fenoxycarb and pyriproxyfen, 0.2 ppb for hydramethylnon, and 0.05 ppb for the other insecticides.

Pesticide Use

The following table details pesticide use reported to DPR in Riverside and Orange counties in 1999- 2000. This table does not include pesticides used by homeowners.

Pesticide Use (Pounds Active Ingredient) in Riverside and Orange Counties 1999-2001

Chemical	Riverside County			Orange County		
	1999	2000	2001	1999	2000	2001
Bifenthrin	677	1,263	1,630	5,365	6,839	5,128
Chlorpyrifos	54,697	64,127	43,339	71,937	34,311	23,484
Diazinon	18,182	18,917	14,604	24,535	29,903	27,319
Dimethoate	47,087	23,673	11,913	1,964	1,124	2,375
Fenoxycarb	4	1	8	48	47	42
Hydramethylnon	75	105	253	134	164	195
Malathion	55,828	39,620	35,669	5,949	4,692	8,521
Methidathion	1,042	289	2,325	0	0.2	0
Pyriproxyfen	247	482	87	10	42	135

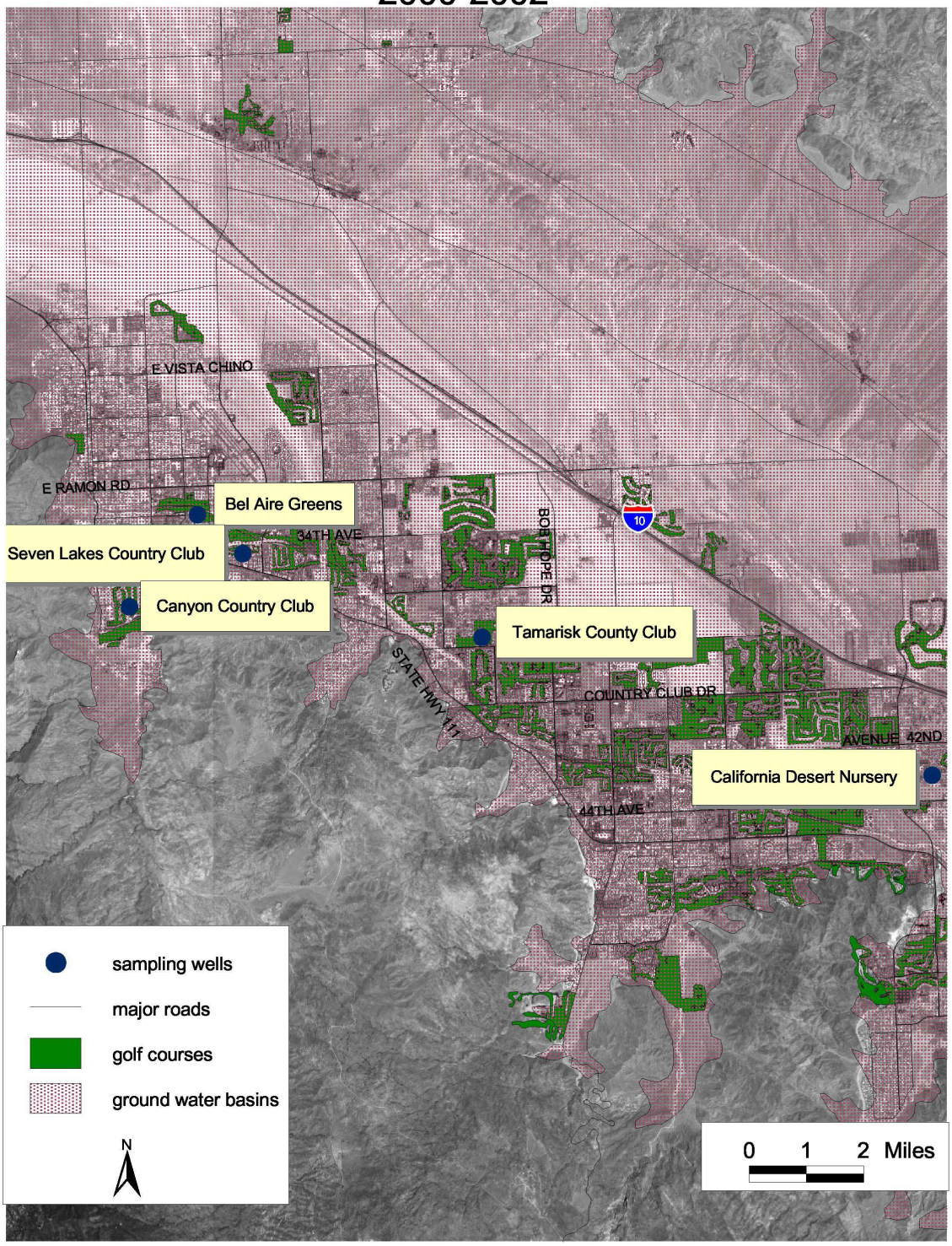
RESULTS and DISCUSSIONS

Insecticide Concentrations

Of the nine insecticides analyzed, only chlorpyrifos, bifenthrin, fenoxycarb, hydramethylnon, and pyriproxyfen were allowed use in nurseries for treatment of fire ants to comply with the U.S. Department of Agriculture's quarantine requirements and in golf courses under the compliance agreement. All of the organophosphorus insecticides listed are registered for uses in commercial agriculture, nurseries, golf courses or parks for the control of other insect pests. Malathion and diazinon are widely available for homeowner use.

There were no detections above the reporting limits for the nine insecticides in the well water samples. The results probably reflect the low amount of insecticides used for RIFA treatments.

RIFA Well Monitoring in Riverside County
2000-2002



RIFA Well Monitoring in Orange County
2001